#### (12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

### (19) World Intellectual Property Organization

International Bureau



# 1 | 1881 | BINGROUN BROWN | 1881 | BROWN BROWN | 110 | 111 | BROWN BROWN BROWN BROWN BROWN BROWN BROWN BROWN B

#### (43) International Publication Date 13 October 2005 (13.10.2005)

#### **PCT**

# (10) International Publication Number WO 2005/094706 A1

(51) International Patent Classification<sup>7</sup>: A61B 17/72

(21) International Application Number:

PCT/EP2005/003395

**(22) International Filing Date:** 31 March 2005 (31.03.2005)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:

04007786.9 31 March 2004 (31.03.2004) EP 04007785.1 31 March 2004 (31.03.2004) EP

(71) Applicant (for all designated States except US): ORTHOFIX INTERNATIONAL B.V. [NL/NL]; Johannes Vermeerplein 11, NL-1071 Amsterdam (NL).

(72) Inventors; and

(75) Inventors/Applicants (for US only): COATI, Michele

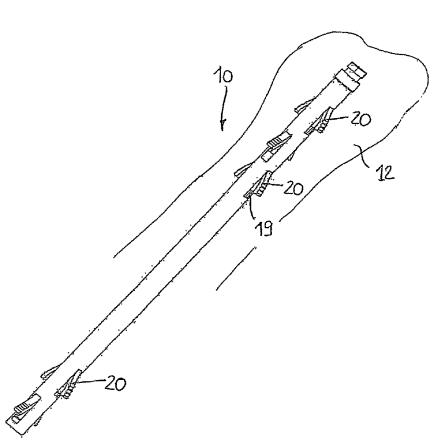
[IT/IT]; Via A. Vivaldi, 2, I-37029 San Pietro in Cariano (IT). **MARAZZI, Giancarlo** [IT/IT]; Via Strà Favia 1/A, I-21047 Saronno (IT). **MARINI, Graziano** [IT/IT]; Via IV Novembre, 74/A, I-37060 Castel D'Azzano (IT). **ROSSI, Graziano** [IT/IT]; Via L. de Besi, 22, I-37139 Verona (IT). **ROSSI, Luigi** [IT/IT]; Via Forte Laghetto, 8, I-37019 Peschiera del Garda (IT). **VENTURINI, Daniele** [IT/IT]; Via dei Carpini, 36, I-37064 Povegliano Veronese (IT).

(74) Agents: BOTTI, Mario et al.; Botti & Ferrari S.r.l., Via Locatelli, 5, I-20124 Milano (IT).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ,

[Continued on next page]

(54) Title: INTRAMEDULLARY NAIL COMPRISING ELEMENTS OF SHAPE-MEMORY MATERIAL



(57) Abstract: An intramedullary nail (10, 110, 210, 310, 410, 510, 610) suitable for insertion in a fractured elongate bone (12), of the type comprising a stem (14, 114, 214, 314, 414, 514, 614) extended between a proximal end (16, 116, 216, 416, 516, 616) and a distal end (18, 118, 218, 418, 518, 618). The nail comprises a plurality of elements (20, 120, 220, 320, 420, 520, 620) realised with at least one shape-memory material, a plurality of seats (19, 119, 219, 319, 419, 519, 619) formed in the stem (14, 114, 214, 314, 414, 514, 614) for housing the elements (20, 120, 220, 320, 420, 520, 620). The elements (20, 120, 220, 320, 420, 520, 620) are suitable to take a first shape wherein they are retractably housed in the respective seats (19, 119, 219, 319, 419, 519, 619) and a second shape wherein they project from the respective seats (19, 119, 219, 319, 419, 519, 619).

## WO 2005/094706 A1



TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

#### Published:

with international search report

 before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.